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Remarks

In view of the following discussion, the applicants submit that none of the claims now pending in the application are obvious under the provisions of 35 U. S. C. § 103. Thus, the applicants believe that all of these claims are in allowable form.

Claims 1-16 remain pending in this application with claims 1 and 15-16 being amended by this response. Claims 15-16 have been amended for clarity purposes the wording "Projection apparatus" being used to be consistent with claim 14. Claim 1 is also amended to recite "the axis of the hyperbolic mirror that passes through the foci of the hyperbolic mirror, coincides with the optical axis of the combination of lenses". Support for this amendment can be found throughout the specification and more specifically in figures 3-15 and on page 7, lines 21-23 (*"the axis of the hyperbola that passes through the foci of the hyperbola coincides with the optical axis XX' of the lens L'1"*).

REJECTIONS

A. 35 U. S. C. § 103

1. Claims 1 and 7-12 are patentable over Bassi et al. in view of Tadic-Galed et al.

Claims 1 and 7-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Bassi et al. (U.S. Patent 7,239,360 issued July 3, 2007) in view of Tadic-Galed et al. (U.S. Patent 6,220,713 issued April 24, 2001). The applicants submit that these claims are not rendered obvious by the combination of these references.

The present claimed invention provides a projection objective with a specific arrangement. Claim 1 recites that the axis of the hyperbolic mirror that

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passes through the foci of the hyperbolic mirror, coincides with the optical axis of the combination of lenses. This enables specific optical properties and reduces optical distortion of the projected beam. This claimed feature shows more precisely the functioning of the projection objective and discloses a relationship between the lenses and the reflections mirrors.

Bassi et al. describes projection systems. In no way, Bassi discloses or suggests that an axis of a hyperbolic mirror coincides with an optical axis of projection lens. On the contrary, in the drawings, the optical axis of the projection lens is not the same as any axis of a hyperbolic mirror. For example, on figures 10A, 10B and 11 of Bassi et al., the axis of hyperbolas are mentioned and are quite different from the projection axis that corresponds to the geometric middle of a projection beam (as shown on figure 6 and corresponding description on column 9 lines 14-17 (*"The pre-distorted image is then provided to image projector 64 (projector lens at P) which is oriented at an angle α from horizontal line..."*) and on other figures showing the projectors). In figure 11, if an axis of each hyperbola would coincide with the optical axes of the combination of lenses, the hyperbolic mirrors 121 and 123 would have also a common axis. That is clearly not the case.

Rather, Bassi et al. discloses a system in Fig. 10 based upon features that are quite different of the claimed features. Especially, in column 12 lines 21-27, Bassi et al. recites "Hyperbolic curves have the property that rays coming from one focal point of the hyperbola are reflected as if they were emitted from the other focal point. Projection system 100 illustrates how image projector 104 may be placed at the focal point f_1 of the hyperbola (the axis of the hyperbola is shown in dotted lines)". Bassi et al. specifies the position of the projector in relationship to one focal point of the hyperbola. Bassi et al. is silent about the orientation of the projector regarding the axis of hyperbola as shown above. Using the property of one position of one focal point, Bassi et al. teaches, on the contrary, that there is no need to take into account orientation of projection. Bassi et al. has specifically disclosed orientation of projection such that the axis of

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projection coincide with the geometric middle axis of the beam as shown on figures and that is quite far away from any axis of the hyperbolic mirror(s).

Tadic-Galed et al. is completely unrelated to the present claimed invention because Tadic-Galed et al. does not disclose any projection with hyperbolic mirror. Rather, Tadic-Galed et al. recites specific lenses without any relationship with hyperbolic mirror. Therefore, neither Bassi et al. or Tadic-Galed et al. discloses nor suggests "that the axis of the hyperbolic mirror that passes through the foci of the hyperbolic mirror, coincides with the optical axis of the combination of lenses" as recited in claim 1 of the present invention.

Furthermore, the combination of Bassi et al. and Tadic-Galed et al. neither discloses nor suggests the present claimed invention. The combined system of Bassi et al. and Tadic-Galed et al., similar to the individual systems, neither discloses nor suggests "that the axis of the hyperbolic mirror that passes through the foci of the hyperbolic mirror, coincides with the optical axis of the combination of lenses" as recited in claim 1 of the present invention. The combined system would merely describe a projection system with lenses as in Tadic-Galed et al., and using the teaching of Bassi et al., with an optical axis corresponding to the middle axis of the beam and which would not coincide with any axis of the hyperbolic mirror that passes through the foci of a hyperbolic mirror".

In view of the above arguments, Applicants respectfully submit that claim 1 is patentable over Bassi et al. in view of Tadic-Galed et al. and therefore, claims 7-12 are also patentable based on their dependence on claim 1.

CONCLUSION


Thus, the applicants submit that none of the claims, presently in the application, are obvious under the provisions of 35 U. S. C. § 103. Consequently, the applicants believe that all of the claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

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If, however, the Examiner believes that there are any unresolved issues requiring adverse final action in any of the claims now pending in the application, it is requested that the Examiner telephone Ms. Patricia A. Verlangieri, at (609) 734-6867, so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

Respectfully submitted,



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